

Automatic Pitch Discrimination Testing and Recording Device

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This new invention comprises the necessary electronic and electromechanical components for automatically administering and recording a prearranged testing procedure for the determination of auditory pitch discrimination ability or, more properly, the monaural auditory differential frequency threshold. It is designed to provide measurements at four frequencies in the upper speech range, that is, 500, 1,000, 2,000, and 4,000 Hertz (Hz). The test stimulus consists of a serial pair of tonal pulses (tone bursts), presented monaurally, one being the standard frequency and the other the variable comparison frequency. The response demanded of the testee is a judgment of "same" or "different" following presentation of each pair, registered by depressing one of a pair of appropriately labeled, differently colored tabular keys. Major components of the apparatus are the stimulus generator, the timing and power supply module, and the control module. Auxiliary components are the testee's response box and a data recorder.

The stimulus generator includes two separate inductance-capacitance oscillators, one for the 500- and 1,000-Hz ranges and the second for the 2,000- and 4,000-Hz ranges. The oscillators are plate-keyed with a 100 millisecond rise time to produce the stimulus tone bursts. The required intrarange frequency variation is obtained by the appropriate stepping of grounding taps on series resistance strings in the resistance-capacitance networks shunting the inductance-capacitance oscillator tanks. Output amplitude is stabilized by a forward-acting,

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minimal-distortion, automatic-gain control system following the oscillators. A low-power output stage is provided to drive the low-impedance earphone. The stimulus intensity level may be preset on independent attenuators for each frequency range. Continuous visual monitoring of the test proceedings is provided by a matrix arrangement of indicator lights showing both the standard and variable frequency setting of the frequency selector at any time. Automatic adjustment of stimulus variables is made by means of appropriate signals from the control module to electromechanical selectors in the stimulus variable dimensions. The timing and power supply module provides all power requirements throughout the apparatus. In addition, it provides, on command from the control module, the timing signals from a trio of thyratron timers to control the tone burst durations and interburst spacing in each stimulus presentation.

The control module employs a fixed program of electromechanical logic in a continuous recycling format. The control cycle starts with the initiation of a stimulus presentation. The cycle then holds until a response is registered. (This feature makes the test self pacing for the testee.) Following the response, the cycle proceeds through a response-reading function to the adjustment of the stimulus variable to the value required for the next stimulus presentation. This value is determined by the output of the response-reading function correlated with the pattern of preceding responses. Following this stimulus adjustment, the program recycles to the start or initiation of the next stimulus presentation. Appropriate branching and looping logic is included in the program to accommodate any predictable anomalous or limited response behavior. Preset counting is provided for a stimulus repeat function (on testee's command), for a "practice" mode operation, and for a "trials" mode. During practice mode operation, the stimulus variable adjustment is made in multiple unit steps to provide gross coverage of the test range. Upon reaching the preset number of practice determinations of the differential frequency threshold, the program branches to the trials mode in which the variable adjustment is by unit step in the differential fre-

quency dimension. Following the accumulation of the desired (preset) number of trials, the program is reset to start (practice mode) and the frequency range selector is advanced to the next test frequency. Upon completion of testing at the last test frequency, the system returns to a standby (no test) condition. Also included as a control function is a 50-point prerandomized order program for the standard-variable order determination in each stimulus presentation. As a part of this order program, a number of foil stimuli (both tone bursts of the same standard frequency) are called for in the ratio of one foil to every four test stimuli.

The response reading section of the control module is designed to accept only the first response for each stimulus presentation. It will accept a response at any time following the start of a presentation and provides for storage of any response made before the end of a presentation until that presentation is completed and the response is called for. A complete set of manual controls is provided to permit operator adjustment and initiation in all stimulus

parameters for demonstration, checking, or calibrating procedures.

The testee's response box, in addition to presenting the two response keys, includes a push-button for the stimulus repeat command and three visual cuing lights: (a) a "listen" light, which precedes and continues on through each stimulus presentation; (b) a "vote" light, which follows each presentation and remains on until some response is made; and (c) an "error" indicator, which may be used at operator's option to indicate error response to foil presentations. The data recorder provides a continuous strip chart record of the test proceedings by indicating the setting of the stimulus variable frequency selector at all times. By analyzing the recorded pattern of stimulus adjustment, the operator may determine the testee's differential frequency threshold at each test frequency and may also derive data related to testee's performance in the time dimension, practice effects, error count, and so forth. A separate marker is provided to indicate errors on the foil presentations.

Electric Stimulation of Paralyzed Muscles

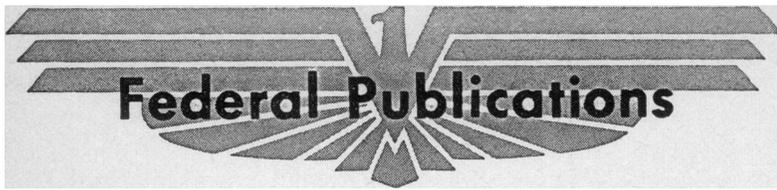
Investigators at the Edward Neimeth Institute for Medical Research at Maimonides Hospital, Brooklyn, N.Y., are conducting a comprehensive, multidiscipline research program on ways to make a person's paralyzed or diseased muscles, including those of the heart and legs, obey electronic commands.

Under a grant from the National Heart Institute, Public Health Service, they are studying methods of employing electronic devices to supplement ailing human hearts. Design of an auxiliary heart to take over part of the working an ailing or scarred heart would otherwise have to do alone has been one major achievement. In experiments on animals, the assistant heart has functioned for 32 days and taken over as much as half the work of the still beating animal heart. Experimental studies of heart transplants in dogs have also already met with some postoperative success. Some success has been achieved in electric stimula-

tion of paralyzed leg muscles, mostly through animal experimentation.

For patients with heart block (in which muscular interconnection between the heart's upper and lower chambers is interrupted to such an extent that the auricle and ventricle beat independently of one another), studies in cooperation with engineers of General Electric Company on an artificial "pacemaker" offer new hope. A workable model has been devised and placed in more than 600 patients; only 15 failures owing to mechanical trouble have occurred.

Dr. Ralph E. Knutti, director of the Heart Institute, called the work being done by the team of medical scientists and engineers led by Dr. Adrian Kantrowitz at Maimonides Hospital "a highly important approach . . . and one that holds promise of reclaiming thousands of persons, many of them in the prime of life."



Environmental Radiation Surveillance. *PHS Publication No. 1224; 1964; 5 pages.* Describes the Public Health Service's nationwide watch over total exposure of the population to radioactive materials. Tells how, in cooperation with State and local health departments and other official agencies, the Service operates an early warning atmospheric radiation surveillance network, a comprehensive pasteurized milk monitoring program, and well-established networks for general air and water pollution monitoring, both of which include radiation analysis. Also describes a Public Health Service-conducted institutional diet sampling program to measure radioactivity in the total diet.

State Laws and Regulations Affecting the Mentally Retarded: A checklist. *PHS Publication No. 1193; June 1964; 27 pages; 25 cents.* Gives guidelines to State planners for use in conducting periodic reviews of State laws affecting the mentally retarded. Designed to assist States in preparing an orderly inventory of existing laws and in determining needs for additional legislation. Kinds of laws to be looked for by State planners are grouped under 11 sections which include worksheets for such entries as specific legal citations.

Field Procedures for Bacteriological Studies of Diarrheal Diseases. *PHS Publication No. 1133; 1964; 33 pages; 35 cents.* Describes practical field procedures for laboratory work in connection with evaluation and control of infectious diarrheal diseases caused by common bacterial pathogens. Methods outlined enable a single investigator or a team to process specimens for optimum recovery of pathogens in areas with limited facilities. Procedures given may be modified and expanded depending on field conditions and re-

sources. Techniques used enable worker to prepare cultures of presumptive positive pathogens for definitive diagnosis at a distant central laboratory.

Can You Answer These Questions? *PHS Publication No. 1201; 1964; leaflet; 5 cents, \$2 per 100.* Answers in simple terms, many of the most frequently asked questions on oral cancer. Emphasizes the fact that the cure rate for oral cancer is extremely high if the malignancy is detected early enough to be treated successfully. Discusses the oral cytological smear test as an aid to early diagnosis. Leaflet will be useful for distribution to lay audiences through dental offices or dental and health associations.

Directory of Local Health Units. *PHS Publication No. 118; revised 1964; 76 pages; 30 cents.* Lists local health units of each State by classification of the unit. Gives name of the health officer or administrative head and the city in which headquarters is located. Includes appendix tables showing number of units and counties covered, number of units without medical, nursing, or sanitation personnel, and units with a vacancy in position of health officer or administrative head.

Research in Schizophrenia. *PHS Publication No. 1175, Mental Health Monograph 4; 1964; by Julius Segal and Seymour Kety; 18 pages; 20 cents.* Describes research by scientists in a variety of disciplines at universities and institutions across the country under grant support from the National Institute of Mental Health, and at the institute in Bethesda, Md., by its own research scientists. Discusses biological, physiological, social, and cultural factors believed to contribute to the development of schizophrenia. Among important biological studies

described are those concerned with a search for abnormalities in body fluids of schizophrenics, errors in metabolism, or chromosomal abnormalities. Also reports investigations concerned with improving diagnosis, treatment, and prevention of schizophrenia. States that evidence increasingly indicates that schizophrenia results from a combination of several factors—while physiological factors may play a role in predisposing a person to the disease, psychological stress often triggers the onset. Emphasizes that full understanding of the disorder of schizophrenia awaits more fundamental knowledge about the brain and behavior. Stresses need for basic research in many disciplines.

What About Radiation? *PHS Publication No. 1196, Health Information Series No. 113; 1964; leaflet; 5 cents, \$3 per 100.* Answers in laymen's terms some frequent questions concerning radiation from strontium 90, diagnostic X-rays, shoe-fitting X-ray machines, television sets, radium watch dials and radioactive dishes.

Inborn (Congenital) Heart Defects. *PHS Publication No. 1204, Health Information Series No. 117; 1964; 8 pages; 10 cents, \$5 per 100.* Discusses symptoms of inborn heart defects and what is known of their cause and describes the six most common defects.

This section carries announcements of new publications prepared by the Public Health Service and of selected publications prepared with Federal support.

Unless otherwise indicated, publications for which prices are quoted are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Public Health Service, Washington, D.C., 20201.

The Public Health Service does not supply publications other than its own.

STRIFFLER, DAVID F. (University of Michigan), ATKINS, WALTER D., CALDWELL, CHARLES G., HARRIS, JOSEPH G., and LOWE, ROBERT P.: *Fluoridation of water supplies in small rural communities. Public Health Reports, Vol. 80, January 1965, pp. 25-32.*

The feasibility of fluoridating the water supplies of small rural communities was tested in northern New Mexico through a project jointly financed by the New Mexico Department of Public Health and the Public Health Service. Some 25 rural water systems serving populations ranging from 70 to 760 persons (total population served, 8,310) were fluoridated successfully with a minimum of technical difficulty and expense through a centralized system of maintenance. A

relatively inexperienced sanitarian was oriented and trained to install and maintain the systems through a minimum of consultation with engineering and dental specialists. The usual cost for a typical installation was about \$100, and annual per capita cost was \$1.22. In four installations, chlorination and fluoridation were accomplished in combination through the use of the same feeding equipment.

DROSNESS, DANIEL L. (California State Department of Health), REED, IRENE M., and LUBIN, JEROME W.: *The application of computer graphics to patient origin study techniques. Public Health Reports, Vol. 80, January 1965, pp. 33-40.*

A primary concern in the area of hospital planning, as well as all health planning, is the spatial distribution and service pattern of a health event, as well as the determination of its incidence for a given population at risk. Sometimes the incidence is of such magnitude or changes so rapidly that traditional methods of data aggregation, geographic presentation, and analysis are inadequate.

For accurate analyses of such data, array and mapping techniques have been developed in the field of urban planning using a general computer program of printing numbers or symbols within a stated geographic area. Instructions are fed to a computer requesting a printout at specified coordinates which have been

described previously to the machine. The computer is thus able to produce numbers that fall in appropriately designated places; then outlines of the boundary areas are superimposed to form a map.

A detailed example covers a county area of 127 census tracts in Santa Clara County, Calif., using a 1-year total of 80,000 consecutive admissions from these census tracts to the 8 general hospitals in the county.

The computer technique was estimated to require less than half the manual time needed for the initial series of mapping. For subsequent use, less than one-tenth of staff time needed for manual mapping of each series would be required by using the computer graphics system.

JOSEPHSON, ERIC (American Foundation for the Blind): *Screening for visual impairment. Public Health Reports, Vol. 80, January 1965, pp. 47-54.*

A random sample of nearly 3,700 households, divided into a telephone sample of approximately 2,800 homes and a nontelephone sample of 900 households, including unlisted numbers, was screened with a checklist of health items including "serious trouble seeing even when wearing glasses."

Our screening uncovered 152 cases of "trouble seeing." In the nontelephone sample the prevalence of reported visual impairment (37.5 per 1,000) was nearly twice that found in the telephone sample (19.3 per 1,000). To check the possibility of under-reporting, a sample of 220 households (569 individuals) with no reported cases of visual impairment in

the original telephone screening was randomly selected for personal re-interviews. This followup uncovered one previously unreported case of moderate trouble in seeing and suggested that the difference between prevalence rates in the telephone and nontelephone samples was not caused by variation in interviewing techniques.

Visual acuity tests were given in the homes of 122 respondents, providing a check against self-reported disability. Almost one-fourth of those who said they were able to read newspaper print could not read 8-point type. Relatively little agreement was found between home tests of vision and clinical records.

LEVISON, MATTHEW E. (Communicable Disease Center, Public Health Service), and HADDON, WILLIAM, JR.: *The area adjusted map: An epidemiologic device. Public Health Reports, Vol. 80, January 1965, pp. 55-59.*

The distribution of events on a map is influenced by variations in both attack rate and population density. The influence of the latter can be eliminated by using a population-by-area cartogram, a map in which the areas are adjusted in proportion to population.

The adjustments may correspond to the total population or to any of its segments, such as the child population. Other types and characteristics of events may be indicated as on a conventional map.

Population-by-area cartograms facilitate the rapid visualization of geographic variations in attack rates. They are especially useful as a practical screening device to identify events sufficiently clustered to warrant further investigation. To illustrate these applications, cases of in-situ cervical carcinoma and Wilm's tumor were plotted on a cartogram of upstate New York prepared to a scale of 500,000 people per square inch.

FOEGE, W. H. (Harvard University School of Public Health), LELAND, O. S., MOLLOHAN, C. S., FULGINITI, V. A., HENDERSON, D. A., and KEMPE, C. H.: *Inactivated measles-virus vaccine. A field evaluation. Public Health Reports, Vol. 80, January 1965, pp. 60-64.*

A placebo controlled study of inactivated measles-virus vaccine was conducted among susceptible kindergarten children in Colorado Springs, Colo. A community outbreak of measles between 2 and 6 months after the final vaccine injection showed the vaccine to be 82 percent effective in preventing measles. No conclusions can be drawn regarding effectiveness of the vaccine for longer periods of time.

Epidemiologic investigation and a limited number of antibody determinations suggest that persistent antibody titers 10 months after immunization are related to clinical or sub-clinical infections with natural measles virus rather than a prolonged effect of the inactivated vaccine. If this is true, permanent immunity would not be expected from inactivated vaccine alone.

SCHROGIE, JOHN J. (Public Health Service): *Training in cardiopulmonary resuscitation. Public Health Reports, Vol. 80, January 1965, pp. 68-74.*

The demonstration in 1960 that closed-chest resuscitation was not only effective and practical but also superior to previously accepted techniques revolutionized the treatment of cardiopulmonary arrest. Initial training was limited to physicians but, because this was often casual and unevenly disseminated, many physicians, otherwise well trained, did not receive adequate instruction.

Since cardiopulmonary arrest occurs ubiquitously, dentists, nurses, rescue personnel, and other persons in high-risk occupations obviously should also be able to perform closed-chest cardiac resuscitation. Yet, with notable exceptions, progress in training these groups has been relatively slow, largely because of unsatis-

factory policy development and inadequate formulation of performance guidelines.

The heart disease control program of the Public Health Service has encouraged dissemination of closed-chest resuscitation techniques and emphasized the leadership role of physicians by supporting instructors courses for physicians and studies of teachability at all levels of skill. This experience has led to the conclusion that an effective course must include a standard, authoritative film presentation, an illustrated slide lecture on resuscitation techniques, and supervised practice on a manikin followed by a test.

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BAHN, ANITA K. (Public Health Service): *Need of a classification scheme for the psychosocial disorders. Public Health Reports, Vol. 80, January 1965, pp. 79-82.*

Because of the nature of psychosocial dysfunctioning, many diverse community agencies and individuals must cooperate in programs of intervention. To supplement and broaden the current American Psychiatric Association diagnostic and statistical classification of mental disorders, a multidimensional classification scheme is needed that will be valid and functionally useful for the operational programs of these various agencies. Such a system would permit the collection of comparable data across agency lines for communitywide action and epidemiologic and planning studies.

The feasibility of uniform classification is based on two successful experiences: the development and widespread use of standardized reporting of patient services for the 1,900 mental health clinics in the country and the current acceptance of a standard diagnostic scheme for general medical services. Some criteria and attributes are outlined for a possible classification scheme. Initial steps in its development are recommended including the necessary cooperative efforts and broad participation of specialists through working groups.

SOUTHWORTH, WARREN H. (University of Wisconsin): *Survey of tuberculosis information among Madison adults. Public Health Reports, Vol. 80, January 1965, pp. 83-87.*

Fifty-three carefully instructed volunteers from the Madison (Wis.) Tuberculosis Association distributed questionnaires and obtained an 84 percent return from a random-sample survey on tuberculosis information among 520 metropolitan adults. The survey, financed by the Madison Tuberculosis Association and co-sponsored by the Dane County Medical Society, Dane County Health Department, and the Madison Department of Public Health, was conducted through facilities of the University of Wisconsin.

Information from the survey points to the need for focusing portions of the tuberculosis educational program toward (a) the age group 70 years of age or older, (b) families in the lower in-

come bracket, and (c) persons with less than college education.

The data indicate that while some misunderstandings about tuberculosis are being eliminated, others are becoming more prevalent. Evidence also exists that without frequent reminders, people do forget and young people grow up without acquiring certain facts.

Fifty of the 83 items in the questionnaire can be said to have a correct answer or a favorable response. To almost half of these questions, better than 80 percent of Madisonians scored correct or favorable responses. Despite the good record, careful examination of the survey results shows that a need still exists for education to prevent complacency and to promote progress toward the eradication of tuberculosis.

The nature of a paper, not its importance or significance, determines whether a synopsis is printed. See "Information for Contributors" on next page.